Illinois Department of Transportation

To:	Kevin Marchek	Attn: Dave Broviak	
From:	Jack Elston	By: Michael Brand	MSB
Subject:	Pavement Design Approval		
Date:	March 6, 2019		

Route:	FAP 326 (IL 47)	Job No.:	P-93-013-07
Section:	(107,108,108S)R-1	Contract No.:	66989
County:	Kendall	Target Letting:	
Limits:	Kennedy Road in Yorkville to US 30 [Will Countyline]		

We have reviewed the pavement design for the above referenced project which was submitted on January 3, 2019. The scope of the project involves replacing the existing two-lane section with a four-lane section.

The pavement design resulted in two pavement options: 12.5" Full-Depth HMA and 10.25" PCC. The life-cycle cost analysis of those options resulted in the PCC pavement being 15.8% less expensive ($158,847/mile compared to HMA's cost of $183,909/mile).

In summary, the approved pavement design is as follows:

10.25" PCC Pavement
w/ 10.25" tied PCC Shoulders or Curb & Gutter
4" HMA Stabilized Subbase
12" Improved Subgrade

If you have any questions, please contact Mike Brand at (217) 782-7651.

Illinois Department of Transportation

Memorandum

To:	Jack Elston	Attn:	Mike Brand
From:	Kevin Marchek	By:	Dave Broviak
Subject:	Pavement Design for Approval *		
Date:	January 3, 2019		

* FAP 326 (IL 47)
Section (107,108, 108S)R-1
Kane & Kendall Counties
Job No. P-93-013-07
Contract No. 66989
Reconstruction of IL 47 from Kennedy Road in Yorkville to Cross Street in Sugar Grove.

Attached are two pavement designs for IL 47 from Kennedy Road in Yorkville to Cross Street in Sugar Grove. Please review and approve the designs which recommend 10.25 inches of Jointed Plain Concrete Pavement (JPCP) from Kennedy Road to US 30 and 10.5 inches of JPCP from US 30 to Cross Street. Construction of the portion of the project from Galena Road to Cross Street is tentatively anticipated in FY 2024 subject to project readiness and funding availability.

JPCP is the preferred pavement type based on life cycle cost in the attached analyses. Construction of 10.25 inches of JPCP has a life cycle cost 15.8% less than 12.5 inches of full-depth HMA pavement. Construction of 10.5 inches of JPCP has a life cycle cost of 13.2% less than 13.25 inches of full-depth HMA pavement. The cost of stabilized subbase was included in the JPCP design for both sections. This project is not suitable for the alternative pavement bidding process because the life cycle cost difference is more than 10%. Calculations to determine pavement thicknesses and life-cycle costs are attached and electronic files have been emailed for review.

The project involves replacing an existing two-lane section with a four-lane section from Kennedy Road in Yorkville to Cross Street in Sugar Grove. The design proposes four lanes with raised curb median, auxiliary lanes as needed, and tied curb and gutter or shoulder along the outside edge of pavement. The estimated quantity of new pavement is 122,321 square yards of mainline pavement from Kennedy Road to US 30 and 96,082 square yards of mainline pavement from US 30 to Cross Street. The pavement design was prepared using Chapter 54 of the Bureau of Design & Environment manual, current as of November 2018. The following facts and assumptions were used in the design:

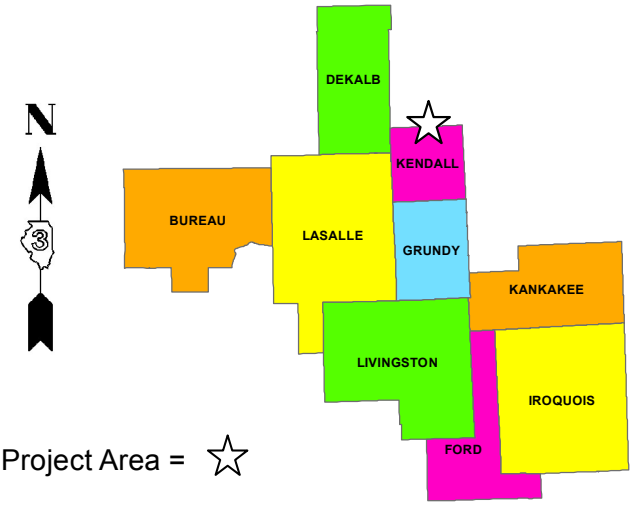
- Jointed Plain Concrete Pavement constructed with B-6.24 combination curb and gutter along the inside edge and B-6.24 combination curb and gutter or full depth tied shoulder along the outside edge.
- Four inches of HMA stabilized subbase is included in the cost of the JPCP designs.
- Flexible pavement cost includes a full depth HMA shoulder based on BDE section 34-2.02 (c).
- Flexible pavement cost does not include additional lower binder required to extend underneath proposed combination curb and gutter as shown in Highway Standard 606001-07.
- Design Traffic is based on 2040 projections.
- Design Period is 20 years.
- Existing subgrade is considered poor.
- PG grade 64-28 for top lift of binder and the surface course.
- PG 64-22 for the lower binder lifts.
- Rubblization and unbonded overlay were not considered because the proposed pavement is significantly wider than the existing pavement and in some areas the centerline is shifted to reduce floodplain impacts.

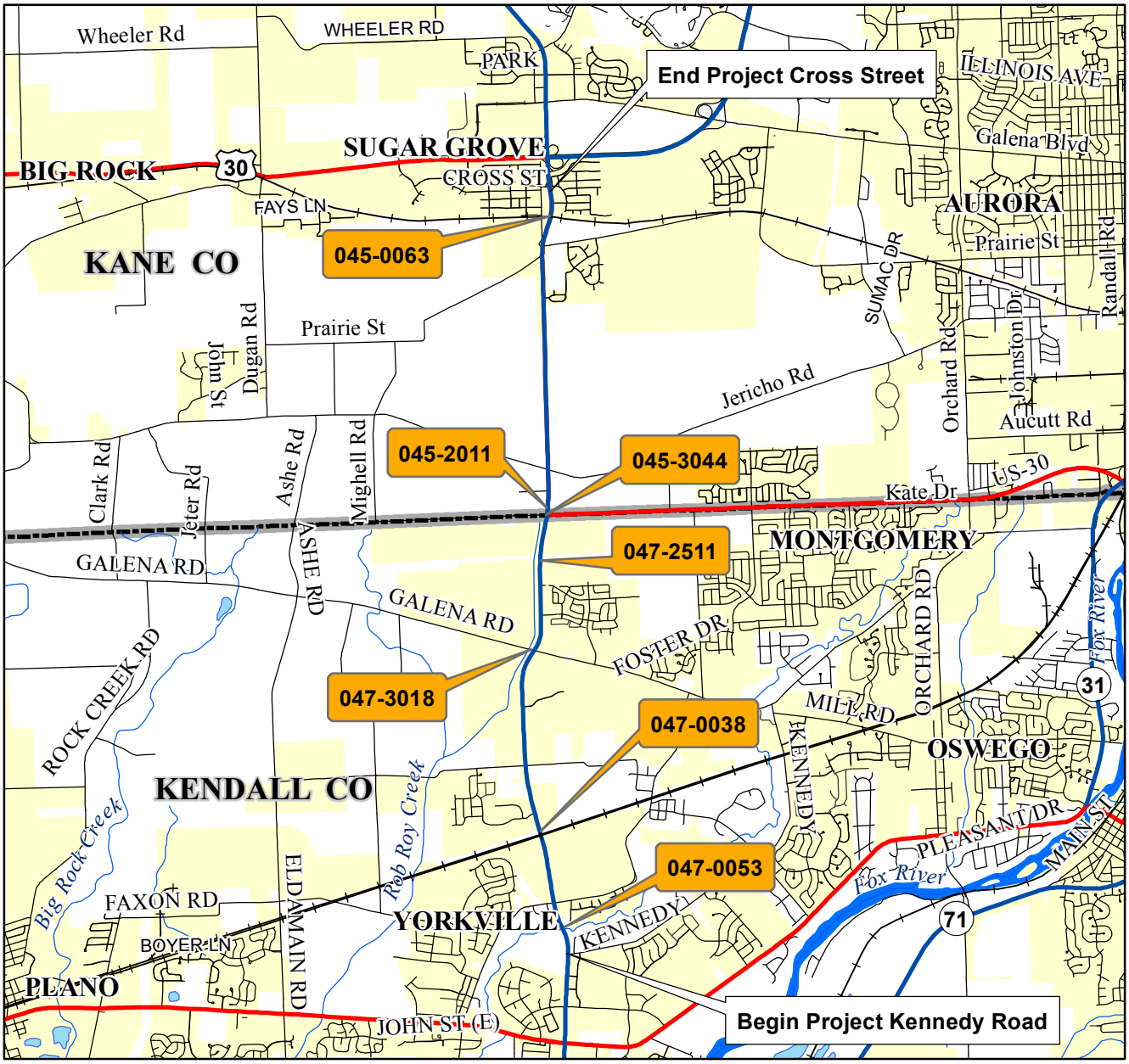
If you have any questions, please contact Dave Alexander, Project Engineer, at (815) 434-8468.

DA:dld

Project Location Map

Project Location Map
FAP 326 (IL 47 & US 30)
Section (107, 108, 108S) R-1
Kendall & Kane Counties
Kennedy Road (N. of Yorkville) to Cross St. in Sugar Grove
P-93-013-07
Contract 66989





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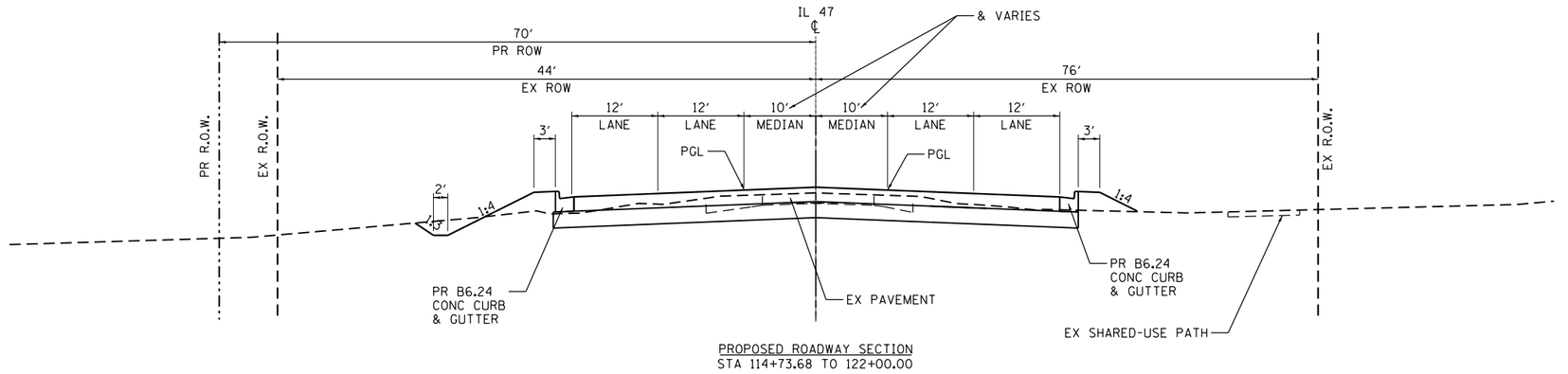
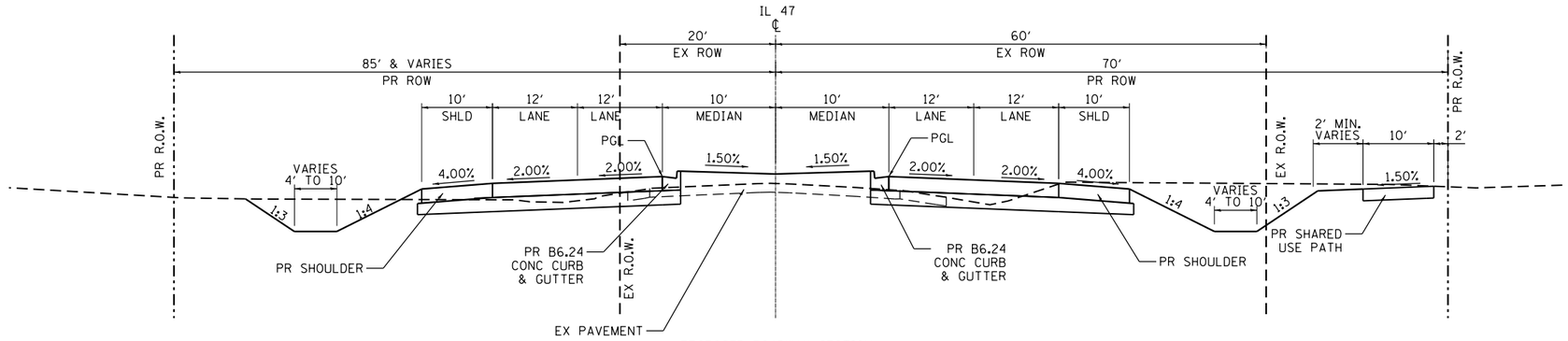


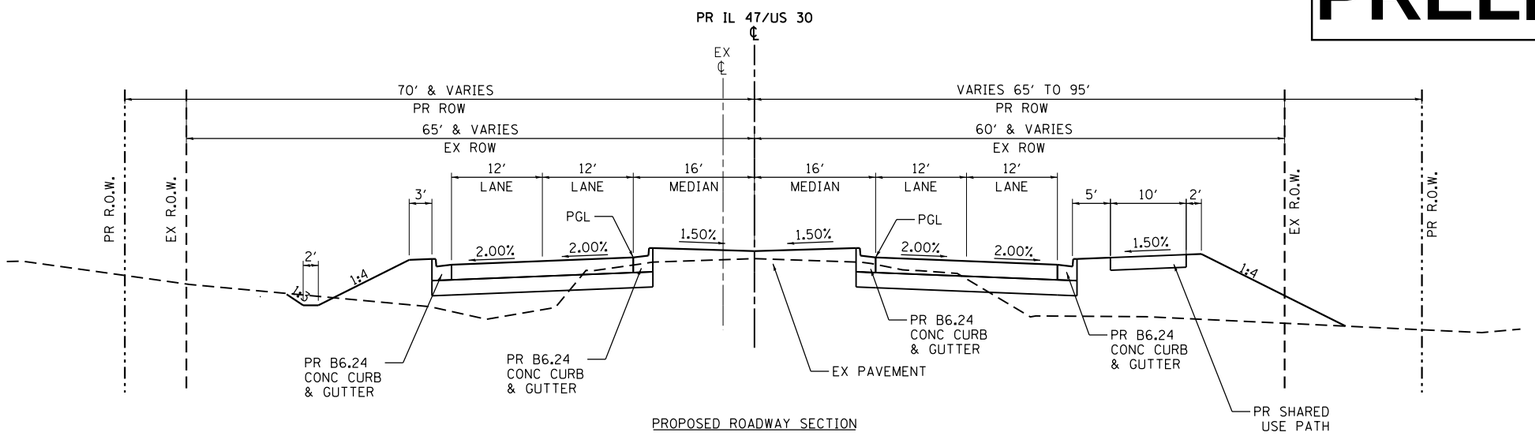
PROPOSED ROADWAY SECTION
STA 114+73.68 TO 122+00.00



PROPOSED ROADWAY SECTION

STA 129+42.06 TO 131+77.35

PRELIMINARY



PROPOSED ROADWAY SECTION

STA. 136+25.00 TO 172+00.00

STA. 184+00.00 TO 205+00.00

NOTE:
PAVEMENT DESIGN WILL BE FINILIZED IN PHASE II.

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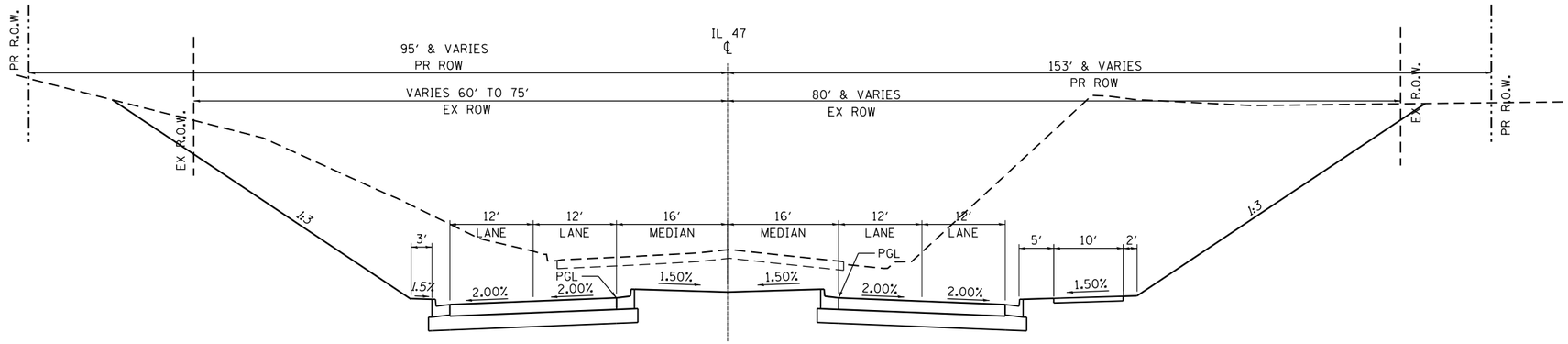
	PLOT DATE = 8/14/2017	DATE - 8/14/2017	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
IL-47

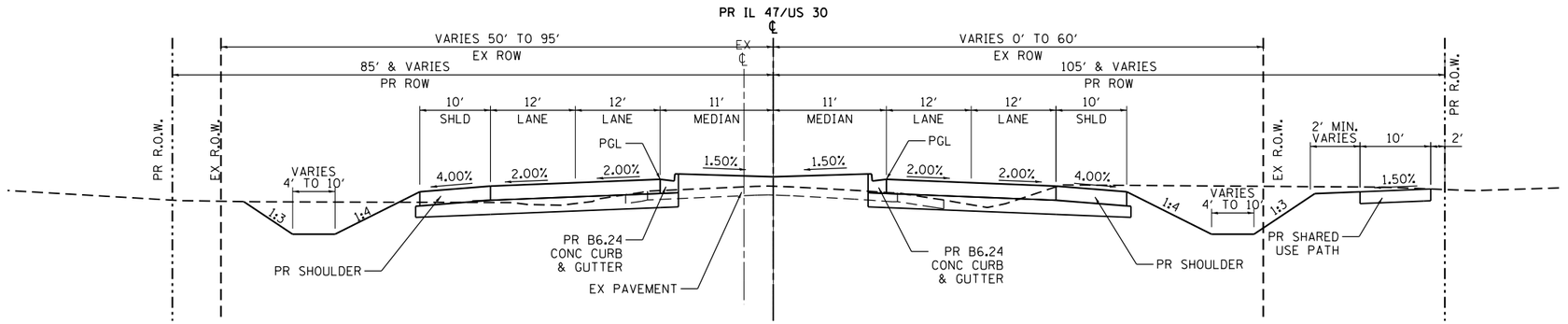
SCALE: NTS | SHEET NO. 1 OF 3 SHEETS | STA. | TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
326	108-SB NRH	KENDALL		
		CONTRACT NO. 66989		
		ILLINOIS FED. AID PROJECT		



PROPOSED ROADWAY SECTION

STA. 172+00.00 TO 184+00.00



PROPOSED ROADWAY SECTION

STA 213+00.00 TO STA 254+35.00

PRELIMINARY

NOTE:
PAVEMENT DESIGN WILL BE FINILIZED IN PHASE II.

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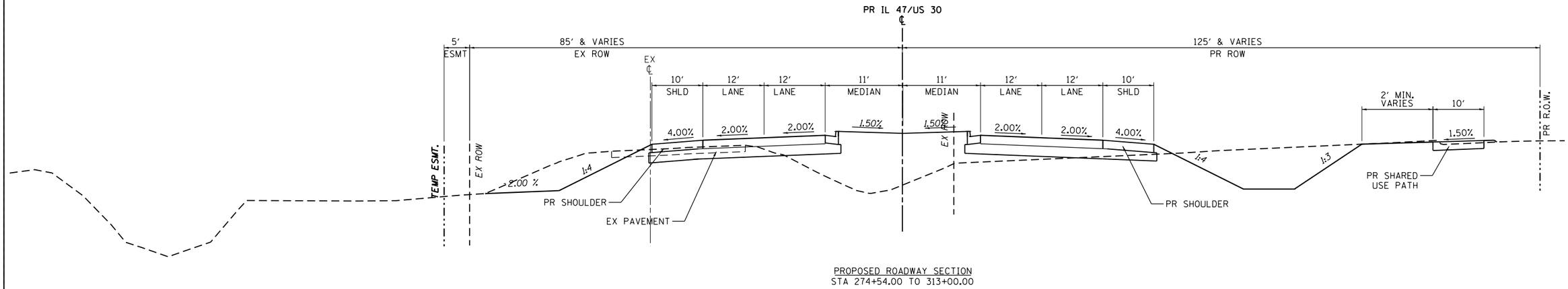
	PLOT DATE = 8/14/2017	DATE - 8/14/2017	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

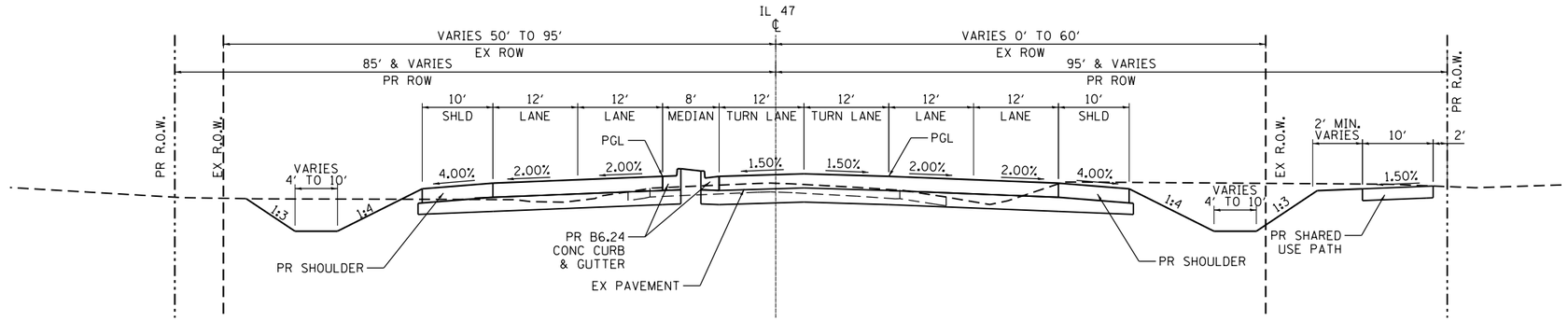
TYPICAL SECTIONS
IL-47

SCALE: NTS | SHEET NO. 2 OF 3 SHEETS | STA. | TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
326	108-SB NRH	KENDALL		
		CONTRACT NO. 66989		
	ILLINOIS	FED. AID PROJECT		



PROPOSED ROADWAY SECTION
STA 274+54.00 TO 313+00.00



PROPOSED ROADWAY SECTION
DUAL LEFT-TURN LANE

PRELIMINARY

NOTE:
PAVEMENT DESIGN WILL BE FINILIZED IN PHASE II.

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	PLOT DATE = 8/14/2017	DATE - 8/14/2017	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
IL-47

SCALE: NTS | SHEET NO. 3 OF 3 SHEETS | STA. | TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
326	108-SB NRH	KENDALL		
		CONTRACT NO. 66989		
	ILLINOIS FED. AID PROJECT			

BDE 5401 Template (Rev. 09/05/2013)

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 11/13/2018

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: F.A.P. 326 (IL 47)
Section: 108-SB NRH
County: Kendall
Location: IL 47 North of Yorkville to Kane Co Line
Comments:
Design Date: 10/11/2017 AN <-- BY
Modify Date: <-- BY

	ADT	Year
Current:	17,500	2011
Future:	34,000	2040

Facility Type: Other Marked State Route
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2020
Design Period (DP) = 20 years

	Minimum ADT	Structural Design Traffic: Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	24,630	87.0%	P = 32%
SU =	250	1,699	6.0%	S = 45%
MU =	750	1,982	7.0%	M = 45%
		Struct. Design ADT = 28,310		(2030)

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	132.5		Csu =	143.81	
Cmu =	482.53		Cmu =	696.42	
TF flexible (Actual) =	10.66	(Actual ADT)	TF rigid (Actual) =	14.64	(Actual ADT)
TF flexible (Min) =	3.56	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	5.02	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 10.66
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
Goto Map
HMA Mixture Temp. = 75.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 680 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 61 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 12.50 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 12.50 inches

JPC Pavement

Use TF rigid = 14.64
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 10.25 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 14.64
IBR value = 3

CRCP Thickness = 9.50 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 10.66
Goto Map
HMA Overlay Design Thickness = 9.75 in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)

Use HMA Overlay Thickness = 999.00 inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C) PV	SU	MU
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class	Traffic Factor ESAL Coefficients: Rigid (Fig. 54-4.C) Csu	Cmu	Flexible (Fig. 54-5.B) Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B): Rural P	S	M	Urban P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

BDE 5401 Template (Rev. 09/05/2013) Printed: 12/04/2018
LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT Standard Design

ROUTE	F.A.P. 326 (IL 47)					
SECTION	108-SB NRH					
COUNTY	Kendall					
LOCATION	IL 47 North of Yorkville to Kane Co Line					
FACILITY TYPE		NON-INTERSTATE				
PROJECT LENGTH			19826	FT = = >	3.75	Miles
# OF CENTERLINES			2	CL		
# OF LANES			4	LANES		
# OF EDGES			4	EP		
LANE WIDTH - AVERAGE			12	FT		
SHOULDER WIDTH	HMA	Inside	0	FT		
	HMA	Outside	10	FT		
	Total Width of Paved Shoulders		20	FT		
PAVEMENT THICKNESS (FLEXIBLE)			12.50	IN	14.75	IN MAX
SHOULDER THICKNESS			12.50	IN	HMA_SD	Standard Design
POLICY OVERLAY THICKNESS			2.25	IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	3.56	10.66	10.66

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$113.60 / TON
HMA TOP BINDER	$92.40 / TON
HMA LOWER BINDER	$88.14 / TON
HMA BINDER (LEVELING)	$113.60 / TON
HMA SHOULDER	$75.21 / TON

INITIAL COSTS

ITEM	THICKNESS		100% QUAI	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(12.50")	122321	122,321	SQ YD	*	$67.80	/ SQ YD	$8,292,825	~
HMA SURFACE COURSE	(2.00")	1.0069	13,700	TONS	*	$113.60	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	1.0217	15,412	TONS	*	$92.40	/ TON	$0	
HMA LOWER BINDER COURSE	(8.25")	1.0582	56,512	TONS	*	$88.14	/ TON	$0	
HMA SHOULDER	(12.50")	20079	14,055	TONS	*	$75.21	/ TON	$1,057,077	~
CURB & GUTTER			60,530	LIN FT	*	$20.00	/ LIN FT	$1,210,600	
SUBBASE GRAN MATL TY C (TONS)			1,537	TONS	*	$35.00	/ TON	$53,795	
IMPROVED SUBGRADE:	Aggregate	Width = 72.9	160,614	SQ YD	*	$13.00	/ SQ YD	$2,087,982	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL			105,739	SQ YD		$0.00	/ SQ YD	$0	
SHOULDER REMOVAL			44,058	SQ YD		$0.00	/ SQ YD	$0	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUC	$12,702,279
FLEXIBLE CONSTRUC	$137,969

MAINTENANCE COSTS:

ITEM		THICKNESS		MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY						$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	1.0069	Surface M	2.00	$12.81	/ SQ YD
HMA OVERLAY PVMT		(2.25")	1.0078		2.25	$14.43	/ SQ YD
HMA SURFACE MIX		(1.50")	1.0052	Surface M	1.50	$9.59	/ SQ YD
HMA BINDER MIX		(0.75")	1.0130	Leveling Binc	0.75	$4.83	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")		Shoulder I	2.25	$9.48	/ SQ YD
HMA OVERLAY SHLD		(2.00")		Shoulder I	2.00	$8.42	/ SQ YD
MILLING (2.00 IN)					2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)		Surface M	2.00	$82.72	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)		Shoulder I	2.00	$78.42	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")		Leveling Binc	2.00	$82.72	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")		Shoulder I	2.00	$78.42	/ SQ YD

LONGITUDINAL SHOULDER JOINT ROUT & SEAL		$3.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL		$3.00	/ LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL	(100% Reh	$3.00	/ LIN FT

FLEXIBLE TOTAL LIFE·	$16,931,753
FLEXIBLE TOTAL ANNI	$183,909

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CNTR LINE JOINT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RNDM / THRM CRACK R&S	50.00%	43,617	LIN FT	$3.00		$130,851	
	PD PVMT PATCH M&F SURF	0.10%	122	SQ YD	$82.72		$10,092	
	PWFn =	0.8626		PW =	0.8626	X	$497,811	$429,416
YEAR 10								
	LONG SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CNTR LINE JOINT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RNDM / THRM CRACK R&S	50.00%	43,617	LIN FT	$3.00		$130,851	
	PD PVMT PATCH M&F SURF	0.50%	612	SQ YD	$82.72		$50,627	
	PWFn =	0.7441		PW =	0.7441	X	$538,346	$400,580
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	142,400	SQ YD	$3.00		$427,200	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	1,223	SQ YD	$82.72		$101,170	
	HMA OVERLAY PVMT 2.00"	100.00%	122,321	SQ YD	$12.81		$1,567,122	
	HMA OVERLAY SHLD 2.00 "	100.00%	20,079	SQ YD	$8.42		$169,132	
	PWFn =	0.6419		PW =	0.6419	X	$2,264,624	$1,453,576
YEAR 20								
	LONG SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CNTR LINE JOINT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RNDM / THRM CRACK R&S	50.00%	43,617	LIN FT	$3.00		$130,851	
	PD PVMT PATCH M&F SURF	0.10%	122	SQ YD	$82.72		$10,092	
	PWFn =	0.5537		PW =	0.5537	X	$497,811	$275,626
YEAR 25								
	LONG SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CNTR LINE JOINT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RNDM / THRM CRACK R&S	50.00%	43,617	LIN FT	$3.00		$130,851	
	PD PVMT PATCH M&F SURF	0.50%	612	SQ YD	$82.72		$50,627	
	PWFn =	0.4776		PW =	0.4776	X	$538,346	$257,117
	HMA_SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	142,400	SQ YD	$3.00		$427,200	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	2,446	SQ YD	$82.72		$202,341	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	201	SQ YD	$78.42		$15,763	
	HMA OVERLAY PVMT 2.25 "	100.00%	122,321	SQ YD	$14.43		$1,764,532	
	HMA OVERLAY SHLD 2.25 "	100.00%	20,079	SQ YD	$9.48		$190,274	
	PWFn =	0.4120		PW =	0.4120	X	$2,600,110	$1,071,211
YEAR 35								
	LONG SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CNTR LINE JOINT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RNDM / THRM CRACK R&S	50.00%	43,617	LIN FT	$3.00		$130,851	
	PD PVMT PATCH M&F SURF	0.10%	122	SQ YD	$82.72		$10,092	
	PWFn =	0.3554		PW =	0.3554	X	$497,811	$176,914
YEAR 40								
	LONG SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CNTR LINE JOINT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RNDM / THRM CRACK R&S	50.00%	43,617	LIN FT	$3.00		$130,851	
	PD PVMT PATCH M&F SURF	0.50%	612	SQ YD	$82.72		$50,627	
	PWFn =	0.3066		PW =	0.3066	X	$538,346	$165,034
								$4,229,474
	ROUTINE MAINTENANCE ACTIVITY		15.02	Lane Miles	0.00		$0	$0
							MAINTENANCE	$4,229,474
	45 YEAR LIFE CYCLE CRFn = 0.0407852						MAINTENANCE	$45,940

PCC PAVEMENT JPCP

ROUTE			F.A.P. 326 (IL 47)			
SECTION			108-SB NRH			
COUNTY			Kendall			
LOCATION			IL 47 North of Yorkville to Kane Co Line			
FACILITY TYPE			NON-INTERSTATE			
PROJECT LENGTH			19826	FT = = >	3.75	Miles
# OF CENTERLINES			2	CL		
# OF LANES			4	LANES		
# OF EDGES			4	EP		
LANE WIDTH - AVERAGE			12	FT		
SHOULDER WIDTH	PCC	Inside	0	FT		
	PCC	Outside	10	FT		
	Total Width of Paved Shoulders		20	FT		
PAVEMENT THICKNESS (RIGID)		JPCP	10.25	IN	TIED SHLD	
SHOULDER THICKNESS			10.25	IN		
POLICY OVERLAY THICKNESS			2.50	IN		

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	5.02	14.64	14.64

Worksheet Construction Type is New Construction The Pavement Type is JPCP

INITIAL COSTS

ITEM	THICKNESS		100% QUA	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(10.25")		122,321	SQ YD	*	$51.52	/ SQ YD	$6,301,978
PAVEMENT REINFORCEMENT			0	SQ YD		$0.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")		82,535	SQ YD	*	$18.00	/ SQ YD	$1,485,630
PCC SHOULDERS	(10.25" to 10.25")		23,448	SQ YD	*	$60.00	/ SQ YD	$1,406,880
CURB & GUTTER			60,530	LIN FT	*	$20.00	/ LIN FT	$1,210,600
SUBBASE GRAN MATL TY C	(~ 2.95")		3,381	TONS	*	$35.00	/ TON	$118,335
IMPROVED SUBGRADE:	Aggregate	Width = 64.6	142,289	SQ YD	*	$13.00	/ SQ YD	$1,849,757
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL			105,739	SQ YD		$0.00	/ SQ YD	$0
SHOULDER REMOVAL			44,058	SQ YD		$0.00	/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION	$12,373,180
RIGID CONSTRUCTION	$134,395

MAINTENANCE COSTS:

ITEM	THICKNESS		MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")			2.50		
HMA POLICY OVERLAY PVMT	(2.50")	1.0087		2.50	$16.04	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0052	Surface M	1.50	$9.59	/ SQ YD
HMA BINDER MIX	(1.00")	1.0139	Leveling Binc	1.00	$6.45	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")		Shoulder	2.50	$10.53	/ SQ YD
CLASS A PAVEMENT PATCHING						/ SQ YD
CLASS B PAVEMENT PATCHING					$130.00	/ SQ YD
CLASS C SHOULDER PATCHING					$120.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)			Surface M	1.50	$79.54	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")			Surface M	2.50	$85.90	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL					$3.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL					$3.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL					$3.00	/ LIN FT
RANDOM CRACK ROUT & SEAL			(100% Rehab = 100.00' /		$3.00	/ LIN FT

RIGID TOTAL LIFE-C	$14,624,393
RIGID TOTAL ANNUAL	$158,847

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Re ######

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT '	$12,373,180	$12,702,279
		ANNUAL C	$134,395	$137,969
MAINTENANCE	LIFE-CYCLE COST	PRESENT '	$2,251,213	$4,229,474
		ANNUAL C	$24,452	$45,940
TOTAL	LIFE-CYCLE COST	PRESENT '	$14,624,393	$16,931,753
		ANNUAL C	$158,847	$183,909

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=========	JPCP	$158,847	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PE	HMA	$183,909	15.8%

\\CENTRAL\Shared\D3\Shared\Studies\Writers\Alexander\Consultant\IL 47 from Kennedy Road to Cross Street\Pavement Design\Dist 3 Design\[BDE 5401 47 Dist 3.x

JPCP MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 12/04/18
-

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 10								
	PAVEMENT PATCH CLASS B	0.10%	122	SQ YD	$130.00		$15,860	
	PWFn =	0.7441		PW =	0.7441	X	$15,860	$11,801
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	245	SQ YD	$130.00		$31,850	
	PWFn =	0.6419		PW =	0.6419	X	$31,850	$20,443
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	2,446	SQ YD	$130.00		$317,980	
	SHOULDER PATCH CLASS C	0.50%	117	SQ YD	$120.00		$14,040	
	LONGITUDINAL SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CENTERLINE JT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	PWFn =	0.5537		PW =	0.5537	X	$688,888	$381,421
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	3,670	SQ YD	$130.00		$477,100	
	SHOULDER PATCH CLASS C	1.00%	234	SQ YD	$120.00		$28,080	
	PWFn =	0.4776		PW =	0.4776	X	$505,180	$241,277
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	4,893	SQ YD	$130.00		$636,090	
	SHOULDER PATCH CLASS C	1.50%	352	SQ YD	$120.00		$42,240	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	122,321	SQ YD	$16.04		$1,962,280	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	20,079	SQ YD	$10.53		$211,415	
	PWFn =	0.4120		PW =	0.4120	X	$2,852,025	$1,174,997
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CENTERLINE JT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	RANDOM CRACK R&S	50.00%	39,652	LIN FT	$3.00		$118,956	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	25,382	LIN FT	$3.00		$76,146	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	122	SQ YD	$85.90		$10,480	
	PWFn =	0.3554		PW =	0.3554	X	$562,450	$199,885
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	612	SQ YD	$130.00		$79,560	
	LONGITUDINAL SHLD JT R&S	100.00%	79,304	LIN FT	$3.00		$237,912	
	CENTERLINE JT R&S	100.00%	39,652	LIN FT	$3.00		$118,956	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	38,074	LIN FT	$3.00		$114,222	
	RANDOM CRACK R&S	50.00%	39,652	LIN FT	$3.00		$118,956	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	612	SQ YD	$85.90		$52,573	
	PWFn =	0.3066		PW =	0.3066	X	$722,179	$221,389
								$2,251,213
	ROUTINE MAINTENANCE ACTIVITY		15.02	Lane Miles	$0.00		$0	$0
							MAINTENANCE	$2,251,213
	45 YEAR LIFE CYCLE CRFn = 0.0407852						MAINTENANCE	$24,452